

# MCA Practice Problems Worksheet #7

(probability and stats)

Key

Name

## Probability and Data/Statistics Problems

1. There are 50 students in the school orchestra in the following sections:  
25 string section, 15 woodwind, 5 percussion, 5 brass

One student will be chosen at random to present the orchestra director with an award. What is the probability the student will be from the woodwind section?

$$\frac{15}{50} = 30\%$$

2. Below is a computer simulation of rolling one six sided cube 50 times.

Outcome	1	2	3	4	5	6
Frequency	8	6	13	11	5	7

- a. What is the theoretical probability of rolling a 3 or a 4?  $\frac{2}{6} = \frac{1}{3} = 33\%$
- b. Calculate the experimental probability of rolling a 3 or a 4.  $\frac{24}{50} = 48\%$

3. A company is offering 1 grand prize, 3 second place prizes, and 25 third place prizes based on a random drawing of contest entries. If your entry is one of the 500 total entries, what is the probability you will win a third place prize?  $\frac{25}{500} = 5\%$

4. A twenty-point quiz is given in algebra. The following list contains the scores of eleven students. Determine if any of the scores are outliers using the definition of an outlier.

An Outlier is a value which lies 1.5 times the inter-quartile range above the third quartile or below the first quartile.

$\frac{9}{1.5} = 6$       4, 8, 9, 10, 11, 11, 11, 12, 13, 16, 20  
outlier      m      Q3      outlier       $13 \cdot 1.5 = 19.5$

5. The frequency chart gives the hourly wage of the employees at BigTop Burgers. Find the mean hourly wage.

\$7.90      (b) \$8.60      c) \$8.30      d) \$9.84

Wage	Frequency
\$7.50	5
\$7.90	10
\$8.30	8
\$9.70	7
\$15.80	1

$266.6$        $31$

6. What measure of central tendency is most affected by an outlier?

mode      (b) mean      c) median      d) standard deviation

7. In a basketball contest, each player will attempt 3 free-throws. If a Sam has a 70% chance of making each free-throw, what is the probability of Sam making exactly 2 out of 3 free-throws?  $(.7)(.7)(.3) = .147$

a) 0.666      (b) 0.147      c) 0.21      d) 0.441

8. The weather forecast calls for a 25% chance of rain each day for the next four days. Find the probability that it will rain 3 out of the 4 days.  $(.25)(.25)(.25)(.75) = .012$

a) 0.047      b) 0.188      (c) 0.012      d) 0.75

9. What is the probability that if a family has 3 children they are all boys? Assume the probability of having a boy =  $\frac{1}{2}$

a) 0.333      (b) 0.125      c) 0.375      d) 0.25

10. Which value will change the most if the outlier is omitted from the data set below?

0 10 11 12 12 12 13 13 14 14 15 16

A. IQR      (B) Mean      C. Median      D. Mode

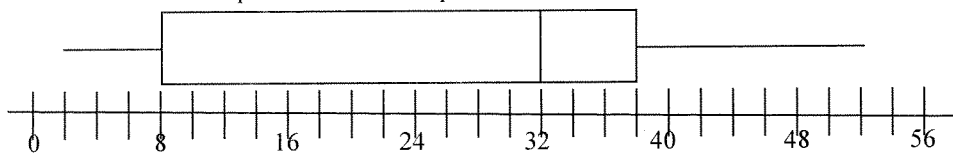
11. Between which two variables would you expect to find a high correlation, but not causation?

A. x – number of hours studying      (B) x – score on a physics test  
y – score on a math test      y – score on a chemistry test

C. x – number of hours worked      D. x – number of CDs purchased  
y – amount of paycheck      y – total amount spent

12. As a decimal, what is the largest the value of the probability of an event occurring?  $1.00$

13. Use the box and whisker plot to answer the questions below.



- a. What is the Q1 value?  
A. 2    **B. 8**    C. 36    D. 42
- b. 50% of data the values are above what value?  
A. 8    B. 24    **C. 32**    D. 38
- c. What is the IQR?  $30$      $38 - 8 = 30$
- d. What is the median?  $32$
- e. What is the Q3 value?  $38$
- f. What is the highest number in the sample?
14. A survey shows that 85% of the registered voters in the Centennial School district voted in the last election. Of those who voted, 54% voted to pass the school levy. What is the probability that a registered voter chosen at random voted to pass the school levy?  
A. .310    **B. .459**    C. .540    D. .629     $.54(.85)$
15. There is a 40% chance of rain today and a 20% chance of rain tomorrow. There is a 10% chance it will rain both days. What is the probability that it will rain today or tomorrow?  
A. 10%    B. 30%    C. 40%    **D. 50%**     $40 + 20 - 10 = 50\%$     both today
16. Examine the following two data sets:  
Set #1: 49, 55, 68, 72, 98    mean =  
Set #2: 26, 56, 57, 75, 82, 89    mean =  
Which of the following statements is true?  
A. They have the same mode.    **B. They have the same median**  
C. They have the same mean.    D. None of the above is true.     $\frac{342}{5} = 68.4$      $\frac{385}{6} = 64.16$

17. Which measure will change the most if the outlier is omitted from the data set shown below?

{0,10,11,12,12,12,13,13,14,14,15,16}

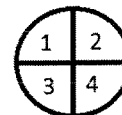
- A. IQR    **B. Mean**    C. Median    D. Mode

18. Using the data in the table at right, answer the following

- A. mean age = median age  
**B. mean age > median age**  
C. mean age < median age  
D. mean age < mode age

Age	Frequency
8	1
10	3
14	2
16	1
17	2

mean =  $\frac{116}{9} = 12.8$   
median = 14  
mode = 10



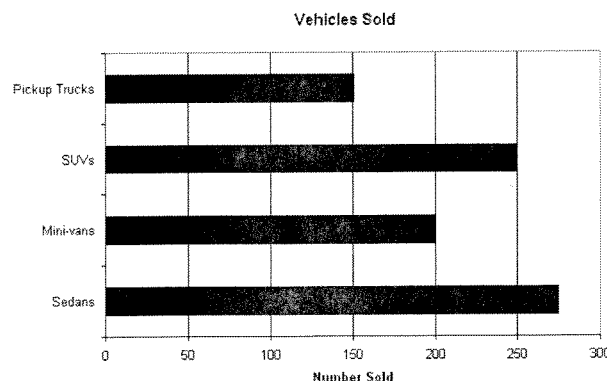
19. What is the probability of rolling a 5 on a six sided die and spinning 4 on the spinner at right?

20. Out of a group of 16 students 6 are to be chosen to serve as peer tutors in algebra. A group of 7 seniors, 5 juniors, and 4 sophomores have volunteered to be tutors. If the students are chosen at random, what is the probability that 2 seniors, 2 juniors, and 2 sophomores will be selected?  
 $\frac{7C2 \cdot 5C2 \cdot 4C2}{16C6}$

21. Paul constructed a bar graph showing the number of each of four types of vehicles sold at Sunshine Motors last year.

Approximately how many more sedans and mini-vans were sold than SUVs and pickup trucks?

- a. 25    b. 50  
**c. 75**    d. 100



$200 + 275 = 475$   
 $150 + 250 = 400$